STATIK DYNAMIK
PROF. DR. MESCHKE

RUB

Master's Thesis

Continuum topology optimization with stress constraints and uncertainties in loading

Supervisor: M.Sc. Simon Peters, Dr.-Ing. Steffen Freitag

Background: Topology optimization has been successfully applied to improve the design of many complex industrial problems, such as in aeronautical, aerospace and naval applications. Its relevance for real world applications has greatly increased due to innovations in additive manufacturing. Most of the topology optimization approaches assume deterministic conditions for the input data, obviating the different sources of uncertainties which may affect significantly the structural performance.

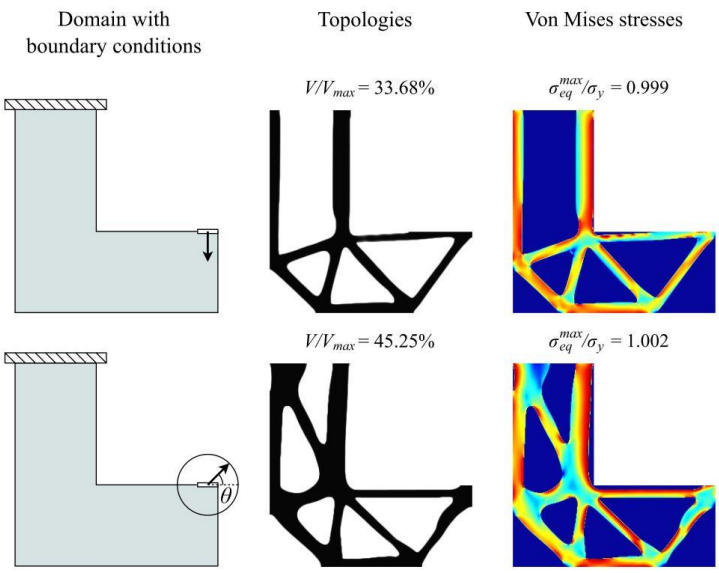

Fig. 1: Design with boundary conditions, optimal topologies and von Mises equivalent stresses [1]

Tasks: Within this master thesis the following tasks are to be completed:

- Familiarization with topology optimization
- Implementation of a local and global stress constraint in an existing Matlab code
- Incorporation of uncertain load and material parameters in this Matlab code
- Computation of classical benchmark problems

Contact:

M.Sc. Simon Peters
Room: IC 6/165
Lehrstuhl für Statik und Dynamik
Ruhr-Universität Bochum
Email: simon.peters@rub.de

[1] Silva et al. - Stress-based robust topology optimization under non-probalistic uncertainty in applied loads, ICVRAM ISUMA UNCERTAINTIES conference, 2018